IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re the Application of

Inventor	**:**	**Helen Routh et al.**
Application No.	**:**	**10/719,374**
Filed	**:**	**November 21, 2003**
For	**:**	**DISTRIBUTED MEDICAL IMAGING SYSTEM AND METHOD**

APPEAL BRIEF

On Appeal from Group Art Unit 3626
Examiner Valerie Lubin

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I. REAL PARTY IN INTEREST

The real party in interest is Koninklijke Philips Electronics N.V., Eindhoven, The Netherlands by virtue of an assignment recorded March 26, 2004 at reel 015152, frame 0759.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

This application was originally filed with Claims 1-29. In response to a restriction requirement, the group comprising Claims 22-29 was elected and Claims 1-21 were withdrawn. Claims 22-29 are pending in the application and stand finally rejected by the Examiner in the Office action mailed July 15, 2009. The claims being appealed are Claims 22-29.

IV. STATUS OF AMENDMENTS

No amendments were filed in response to the final rejection mailed July 15, 2009. A Notice of Appeal with the requisite fee was filed September 15, 2009.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The subject matter of the claimed invention as per independent Claim 22 is a network-distributed diagnostic imaging system. Large hospitals conventionally have a diagnostic imaging department where imaging systems of a variety of different imaging modalities, such as x-ray, CT, ultrasound and MRI, are located and used. Hospitals in large metropolitan areas can have multiple systems of the same modality. There are numerous metropolitan hospitals that have upwards of twenty ultrasound systems, for instance. Since an imaging department can do many studies of many patients and will produce hundreds of images in a typical workday, most large imaging departments generally also have a PACS (picture archiving and communications) system to store and organize the images. The PACS system is effectively a library of digitally stored images, from which selected images can be drawn by diagnosing and referring physicians when needed.

As is well known, ultrasound and other diagnostic imaging systems are standalone systems, each capable of performing all of the functions necessary to scan a patient, process the received signals into images, display the images, then store the images on the imaging system or by a network connection to a PACS system or diagnostic workstation. Diagnostic imaging systems also conventionally have reporting software

packages with which a diagnosing physician can read the images produced by the system from a given patient and compose a diagnostic report for the referring physician on the system which was used to scan the patient.

A large hospital is most efficient when it has sufficient patients and diagnostic needs to keep all of its diagnostic imaging systems busy scanning and diagnosing patients. But imaging needs cannot be predicted and there are times when many systems can sit idle, waiting for patients who need to be imaged. This is an expensive inventory of equipment which is not being used. The present invention solves this problem by abandoning the conventional networking of standalone imaging systems such as the networking of ultrasound systems shown in Fig. 2 of the present application, and creating a distributed diagnostic imaging system as illustrated in Fig. 3. The distributed imaging system takes advantage of equipment and capabilities already present in the hospital such as the data networking of hospital rooms which most hospitals already have in place. Hospitals also generally have computing systems for patient records, billing, inventory, and other data processing needs. Hospitals also generally have patient vital signs monitors in all patient rooms. The distributed imaging system takes advantage of this capital investment which the hospital already owns. The hospital network is used to couple

raw diagnostic imaging data from an acquisition unit to a central data processor and return processed diagnostic images to the monitor or display in the room which supplied the raw data. The diagnostic images are displayed on the patient monitor or other display already present in the room. There are no standalone imaging systems, each fully equipped with integrated signal acquisition devices, image processors and displays. Instead, the central networked data processor does all of the signal and image processing formerly performed by multiple separate imaging systems. To upgrade the ultrasound department, for example, it is no longer necessary to individually upgrade all twenty ultrasound systems. Instead, the upgrade is installed on the central data processor and the upgraded function is available for all ultrasound imaging throughout the hospital. Not only does the networked data processor do all of the signal and imaging processing of multiple standalone systems, it also provides a single system for upgrading the entire hospital. By using this centralized processing and taking advantage of hardware in which the hospital has already invested, diagnostic imaging becomes far more efficient and flexible for the hospital.

To complete the distributed system, it is necessary to provide the diagnostic signal acquisition units which are unique to each type of imaging modality. Ultrasound signals must be acquired by ultrasonic

transducer probes, X-ray signals must be acquired by an X-ray source and detector, MRI signals must be acquired by a magnetic field and receiving coil. These signal acquisition units may be kept in a single location as before, or moved through the hospital to the patient's location as needed. Since the computing part of the system is now centralized, these acquisition units can be smaller, lighter, more portable, and less costly than the standalone systems. The portable aspect gives the hospital greater flexibility in deploying these resources throughout the hospital. The distributed diagnostic imaging system is an important candidate for reducing the cost of healthcare in the future.

Comparing independent Claim 22 to the drawings and specification, it is seen that the claim is supported by reference numerals (#) of the drawings and the specification text (pg., ln) as follows:

22. A method of providing a diagnostic imaging system {#60; pg. 4, ln 31-32} in a health care facility, the method comprising:

installing a data network {#80; pg. 5, ln 12-19} in the health care facility having a plurality of data ports distributed throughout a significant portion of the health care facility {pg. 5, ln 20-27};

obtaining a plurality of diagnostic signal acquisition units {#90, ##90a-f; pg. 5 ln 27 to pg. 6, ln 3} adapted to be coupled to selected ones of the data ports of the network and which are structured to provide diagnostic signals corresponding to diagnostic images acquired using the diagnostic signal acquisition units {pg. 10, ln 18-22};

coupling the diagnostic signal acquisition units to the data network as needed to obtain diagnostic signals using the diagnostic signal acquisition units {pg. 7, ln 8-19};

coupling a network data processor {#62; pg. 5, ln 3-11} to the data network, the network data processor being structured to process the diagnostic signals provided by a plurality of the diagnostic signal acquisition units to produce image data {pg. 8, ln 19 to pg. 9, ln 31}; and

obtaining a plurality of display units {#98; pg. 8, ln 5-18} which are separable from the diagnostic signal acquisition units and are structured to display diagnostic images corresponding to the image data processed by the network data processor, the number of display units obtained corresponding to at least a number of acquisition units that are used simultaneously {pg 13, ln 30 to pg. 14, ln 1},

wherein one of the plurality of display units may be configured to display an image processed by the network data processor from the image data of a selected one of the plurality of diagnostic signal acquisition units {pg. 9, ln 25-27}.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether Claims 22-29 were correctly rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. 5,603,323 (Pflugrath et al.) in view of US Pat. 5,924,988 (Burris et al.) and further in view of US Pat. 5,822,544 (Chaco et al.)

VII. ARGUMENT

Central to the invention of Claims 22 is the step of coupling a network data processor {#62; pg. 5, ln 3-11} to the data network {#80}, the network data processor being structured to process the diagnostic signals provided by a plurality of the diagnostic signal acquisition units to produce image data {pg. 8, ln 19 to pg. 9, ln 31}. As discussed above, it is the network data processor which processes the diagnostic signals of multiple acquisition units and thereby replaces the signal and image processing hardware of numerous standalone imaging systems with one central processor for all of them. Pflugrath et al. does not have a common processor for the data of multiple imaging systems. What Pflugrath et al. has, which is referred to by the Examiner, is an "upgrade data server 120" (col. 3 line 52). The purpose of this server is to send an upgrade program and data to a remote standalone ultrasound system 100, which avoids the need to have a service technician travel to the system site to install the upgrade. There is no suggestion in Pflugrath et al. that the server 120 does any processing of signal or image data of the ultrasound system 100, let alone a plurality of ultrasound systems. Thus it is respectfully submitted that this step is wholly absent from Pflugrath et al.

Burris et al. describes a standalone ultrasound system with a flat panel display. The processor of the standalone system of Burris et al. is

referred to as an "ultrasound image generator" as shown in Fig. 2. In most of the Burris et al. embodiments the ultrasound image generator is in the cart, but in Figs. 14-16 the ultrasound image generator is in a structure 1410 on the other side of the patient from the display. This embodiment was cited to show that the display of an ultrasound system can be located away from the ultrasound system processor. But again, there is no suggestion in Burris et al. that a common processor can do the signal or image processing for a plurality of ultrasound systems. It is respectfully submitted that this step is absent from Burris et al. also.

Chaco et al. was then cited to provide this missing step. Chaco et al. describes a patient care and communication system with a "central processing means [which] facilitates the audio, visual and data communications between the plurality of remote stations, and includes means for determining which of the plurality of remote stations are transmitting the audio, visual and data communications and which of the plurality of remote stations are to receive said audio, visual and data communications, and means for establishing a communication link between the transmitting stations and the receiving stations." (col. 3, lines 25-34. Essentially the central processing means is a data switchboard which establishes the communication link between a source of information and its desired destination. In Chaco et al., like the other

two citations, the central processing means does not do the image processing for one, let alone a plurality, of imaging systems. Accordingly it is respectfully submitted that the missing step is absent from all three citations.

But let us assume that Chaco et al. stands for the broader proposition that a central processing means can receive data from remote terminals, process the data, and return the processed data to the terminal which sent it. Can this concept be combined with Pflugrath et al. and Burris et al.? It is respectfully submitted that it cannot, because Pflugrath et al. and Burris et al. have no need for such capability. Every diagnostic imaging system shown in Pflugrath et al. and Burris et al. (they are all ultrasound systems) is a standalone system with its own processors for its data. There is no need for a remote processor and, in any event, no way to get the raw data from any of their imaging systems to another processor. Only finished, processed images are sent remotely in Burris et al. (to a flat panel display), and in Pflugrath et al. the communication is for transmission and verification of successful installation of a software upgrade. Consequently it is respectfully submitted that one skilled in the art and knowledgeable about Pflugrath et al. and Burris et al. would not look to Chaco et al. because there is no need to do so. It is respectfully

submitted that Claim 22 and its dependent Claims 23-29 are patentable over Pflugrath et al., Burris et al., and Chaco et al. for this further reason.

Claim 22 also calls for obtaining a plurality of display units which are structured to display diagnostic images corresponding to the image data processed by the network data processor. Since neither Pflugrath et al. nor Burris et al. nor Chaco et al. show or suggest a system with a network data processor that processes the acquired data of an imaging system, it follows that the combination of Pflugrath et al., Burris et al., and Chaco et al. fails to show or suggest this claim element also.

The dependent claims also recite steps not shown or suggested by the three citations. Claim 23 recites a step of obtaining a plurality of control units, which is separate from the steps previously recited in Claim 22. In the citations the control units are on the same cart systems as the diagnostic signal acquisition units with no suggestion of separation. Claim 28 calls for uploading upgraded software from a network data processor to at least one diagnostic signal acquisition unit or display unit. Pflugrath et al. describes remote software upgrades, but it is done from a central server of the ultrasound system manufacturer to a standalone ultrasound system, not from a network data processor for a distributed imaging system. It is respectfully submitted that these dependent claims are patentable over the three citations for these further reasons.

Finally, it must be noted that the concept of a distributed diagnostic imaging system is wholly absent from these citations. Diagnostic signal acquisition units, disembodied from their signal processors and sharing a common central processor which produces images for all of the acquisition units, is not suggested by any of these references. Pflugrath et al. shows that a software upgrade for an ultrasound system can be delivered and installed from a remote computer. Burris et al. shows that a flat panel display can be taken off of or be absent from an ultrasound system cart and the images produced by the system shown on a separate display across the room. Chaco et al. show that a central computer can serve as a communication hub for a hospital, directing data, voice, or video signals from a sender to a desired recipient. None of these references, individually or together, suggest the concept of a distributed diagnostic imaging system. It is respectfully submitted that the distributed diagnostic imaging system of Claims 22-29 is patentable over these three references for this further reason.

VIII. CONCLUSION

Based on the law and the facts, it is respectfully submitted that Claims 22-29 are patentable over Pflugrath et al., Burris et al., and Chaco et al. Accordingly, it is respectfully requested that this Honorable Board reverse the grounds of rejection of these claims stated in the July 15, 2009 Office action being appealed.

Respectfully submitted,

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APPENDIX A: CLAIMS APPENDIX

The following Claims 22-29 are the claims involved in the appeal.

22. (previously presented) A method of providing a diagnostic imaging system in a health care facility, the method comprising:

installing a data network in the health care facility having a plurality of data ports distributed throughout a significant portion of the health care facility;

obtaining a plurality of diagnostic signal acquisition units adapted to be coupled to selected ones of the data ports of the network and which are structured to provide diagnostic signals corresponding to diagnostic images acquired using the diagnostic signal acquisition units;

coupling the diagnostic signal acquisition units to the data network as needed to obtain diagnostic signals using the diagnostic signal acquisition units;

coupling a network data processor to the data network, the network data processor being structured to process the diagnostic signals provided by a plurality of the diagnostic signal acquisition units to produce image data; and

obtaining a plurality of display units which are separable from the diagnostic signal acquisition units and are structured to display diagnostic images corresponding to the image data processed by the network data processor, the number of display units obtained corresponding to at least a number of acquisition units that are used simultaneously,

wherein one of the plurality of display units may be configured to display an image processed by the network data processor from the image data of a selected one of the plurality of diagnostic signal acquisition units.

23. (original) The method of claim 22, further comprising:

obtaining a plurality of control units structured to control the operation of either the diagnostic signal acquisition units or the display units, the number of control units obtained corresponding to at least a the number of control units that are simultaneously needed; and

coupling the control units to the data network as needed to either obtain or review diagnostic images.

24. (original) The method of claim 22 wherein the diagnostic signal acquisition units comprise ultrasound acquisition units.

25. (original) The method of claim 22, further comprising expanding the capacity of the diagnostic imaging system by:

obtaining an additional number of the diagnostic signal acquisition units, the number of additional acquisition units obtained corresponding to an estimate of the additional number of image acquisition units that will be needed to acquire diagnostic images.

26. (original) The method of claim 22, further comprising expanding the capabilities of the diagnostic imaging system, comprising obtaining at least one diagnostic signal acquisition unit or at least one display unit having expanded capabilities.

27. (original) The method of claim 22, further comprising expanding the capabilities of the diagnostic imaging system, comprising loading upgraded software into the network data processor.

28. (original) The method of claim 22, further comprising uploading the upgraded software from the network data processor to at least one of the diagnostic signal acquisition units or at least one of the display units.

29. (original) The method of claim 22, further comprising expanding the capacity of the diagnostic imaging system by adding new data processing capability to the network.

APPENDIX B: EVIDENCE APPENDIX

None. No extrinsic evidence has been submitted in this case.

APPENDIX C: RELATED PROCEEDINGS APPENDIX

None. There are no related proceedings.